

What is claimed is:

1. A method for open surgical repair of an aortic aneurysm,  
comprising the steps of:  
inserting a filter into a vessel downstream of an aortic aneurysm;  
5 expanding the filter;  
repairing the aortic aneurysm; and  
collapsing and removing the filter, wherein the filter captures emboli  
while the aneurysm is being repaired.

2. The method of claim 1, wherein the filter is inserted in a retrograde  
10 direction.

3. The method of claim 1, wherein the filter is inserted in an  
antegrade direction.

4. The method of claim 1, wherein the aortic aneurysm is an  
abdominal aortic aneurysm.

5. The method of claim 1, wherein the filter is expanded in the aorta  
15 downstream of the aortic aneurysm.

6. The method of claim 1, wherein the filter is expanded in a first  
iliac artery.

7. The method of claim 6, further comprising the step of expanding a second filter in a second iliac artery.

8. The method of claim 1, wherein the filter is expanded in a first femoral artery.

5 9. The method of claim 8, further comprising the step of expanding a second filter in a second femoral artery.

10. The method of claim 1, wherein the step of repairing the aortic aneurysm further comprises the steps of:

clamping the aorta above the aneurysm;

10 clamping the iliac arteries;

incising the aortic aneurysm; and

inserting and securing a prosthetic graft into the aorta.

11. A medical device for distal protection during open surgical repair of an aortic aneurysm, comprising:

an elongate member having a proximal end and a distal end;

a first expandable filter mounted at the distal end of the elongate member;

5 a second expandable filter mounted at the distal end of the elongate member;

a mechanism for expanding the first filter independently of the second filter; and

10 a mechanism for expanding the second filter independently of the first filter.

12. The medical device of claim 11, wherein the elongate member is a wire.

13. The medical device of claim 11, further comprising a sheath that covers the first and second filters and is removable from the filters by sliding proximally.

15 14. The medical device of claim 11, wherein the first filter is distal to the second filter.

15. The medical device of claim 14, wherein a distal end of the first filter is bonded to the elongate member and a proximal end of the first filter is expandable.

16. The medical device of claim 14, wherein a proximal end of the second filter is bonded to the elongate member and a distal end of the second filter is expandable.

17. The medical device of claim 11, wherein the first expandable filter  
5 comprises a plurality of struts and a mesh bonded to the struts, each strut having a proximal end and a distal end that is closely associated with the elongate member.

18. The medical device of claim 11, wherein the second expandable filter comprises a plurality of struts and a mesh bonded to the struts, each strut having a proximal end and a distal end that is closely associated with the elongate member.

19. The medical device of claim 11, wherein the mechanism for  
10 expanding the first filter is a distal capture sheath that moves distally to release the first filter.

20. The medical device of claim 11, wherein the mechanism for  
expanding the second filter is a proximal sheath that moves proximally to release the  
15 second filter.

21. A method for open surgical repair of an aortic aneurysm,  
comprising the steps of:

providing a shunt comprising a tubular member having a proximal end, a  
distal end, and a lumen therebetween, the tubular member branching and communicating  
5 with a side port located between the proximal end and the distal end;

inserting the proximal end of the shunt into the aorta upstream of the  
aneurysm;

inserting the distal end of the shunt into the aorta downstream of the  
aneurysm;

10 inserting a filter through the side port of the shunt and advancing the filter  
into the aorta downstream of the shunt;

expanding the filter; and

repairing the aortic aneurysm.

22. The method of claim 21, further comprising the step of clamping  
15 the proximal end of the shunt within the aorta and clamping the distal end of the shunt  
within the aorta.

23. The method of claim 21, wherein blood flows through the shunt  
and through the filter to provide distal perfusion while the aortic aneurysm is being  
repaired.

24. The method of claim 21, wherein the aortic aneurysm is an abdominal aortic aneurysm.

25. The method of claim 21, wherein the filter is expanded in the aorta downstream of the aortic aneurysm.

5 26. The method of claim 21, wherein the filter is expanded in a first iliac artery.

27. The method of claim 26, further comprising the step of expanding a second filter in a second iliac artery.

28. The method of claim 21, wherein the filter is expanded in a first  
10 femoral artery.

29. The method of claim 28, further comprising the step of expanding a second filter in a second femoral artery.

30. The method of claim 21, further comprising the step of removing the shunt from the aorta while maintaining the filter in the aorta.

31. The method of claim 21, wherein the step of repairing the aortic aneurysm further comprises the steps of:

clamping the aorta above the aneurysm;

clamping the iliac arteries;

5 incising the aortic aneurysm; and

inserting and securing a prosthetic graft into the aorta.

32. A method for open surgical repair of an aortic aneurysm, comprising the steps of:

10 providing a graft comprising a tubular member having a proximal end, a distal end, and a lumen therebetween;

attaching the proximal end of the graft into the aorta at the superior portion of the aneurysm;

attaching the distal end of the graft into the aorta at the inferior portion of the aneurysm;

15 deploying a filter downstream at least a portion of the aortic aneurysm;

and

repairing or bypassing the aortic aneurysm.

33. The method of claim 32, further comprising the step of clamping the aorta at the proximal end of the shunt and clamping the aorta at the distal end of the shunt.

34. The method of claim 32, wherein the filter is inserted through a stick incision in the graft.

35. The method of claim 32, wherein the filter is deployed within the graft.

5 36. The method of claim 32, wherein the filter is deployed downstream of the graft.

37. The method of claim 32, wherein blood flows through the shunt and through the filter to provide distal perfusion while the aortic aneurysm is being repaired.

10 38. The method of claim 32, wherein the aortic aneurysm is an abdominal aortic aneurysm.

39. The method of claim 32, wherein the filter is expanded in the aorta downstream of the aortic aneurysm.

15 40. The method of claim 32, wherein the filter is expanded in a first iliac artery.

41. The method of claim 40, further comprising the step of expanding a second filter in a second iliac artery.



42. The method of claim 32, wherein the filter is expanded in a first femoral artery.

43. The method of claim 42, further comprising the step of expanding a second filter in a second femoral artery.

5 44. A method for open surgical repair of an aortic aneurysm, comprising the steps of:

providing an elongate tubular member having a proximal end, a distal end, and a lumen therebetween, the distal end having an expandable membrane;

10 inserting the expandable membrane into a vessel downstream of an aortic aneurysm;

expanding the membrane;

repairing the aortic aneurysm;

aspirating emboli through the lumen of the elongate tubular membrane;

and

15 collapsing and removing the expandable membrane, wherein the membrane captures emboli while the aneurysm is being repaired and the emboli are removed through the lumen of the elongate tubular member.

45. The method of claim 44, wherein the aneurysm is an abdominal aortic aneurysm.

46. The method of claim 1, further comprising the step of aspirating emboli that accumulate in the filter.

47. The method of claim 1, further comprising the step of infusing a pharmaceutical agent into the vessel through a catheter that carries the filter, wherein the pharmaceutical agent is selected from the group consisting of ReoPro, urokinase, and heparin.

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